PB83-181115

EPA Evaluation of the PETRO-MIZER Device under Section 511 of the Motor Vehicle Information and Cost Savings Act

(U.S.) Environmental Protection Agency
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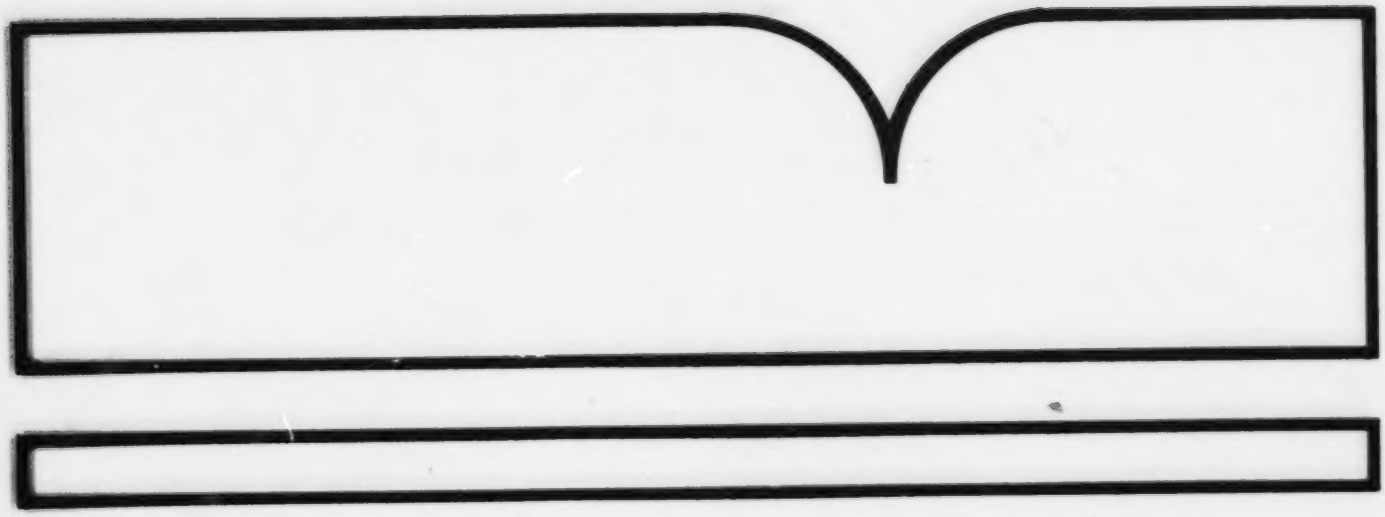

U.S. Department of Commerce
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EPA Evaluation of the PETRO-MIZER Device Under Section 511 of the Motor Vehicle Information and Cost Savings Act

by
Edward Anthony Barth

December 1982

Test and Evaluation Branch
Emission Control Technology Divison
Office of Mobile Sources
U.S. Environmental Protection Agency

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15. SUPPLEMENTARY NOTES

16. ABSTRACT

This document announces the conclusions of the EPA evaluation of the PETRO-MIZER device under the provsions of Section 511 of the Motor Vehicle Information and Cost Savings Act.

The evaluation of the "PETRO-MIZER" device was conducted upon receiving an application for evaluation by the marketer. The "PETRO-MIZER" consists of a tube made from non-magnetic material through which the fuel to be treated flows. Permanent bar magnets are mounted against the tube and sealed in place with resin. A metal casing acts as the outer shell of the device. The "PETRO-MIZER" is installed in the fuel line as specified in section 4-b-1. It is an entirely solid state device and requires no connection to external power. The "PETRO-MIZER" is a device when used in a fuel line leading to the engine of an automobile or truck, results in improved fuel efficiency and reduction in the amounts of polluting emissions.

EPA fully considered all of the information submitted by the applicant. The evaluation of the "PETRO-MIZER" device was based on that information and EPA's engineering judgement and the results of EPA's experience with similar devices. The information supplied by the applicant was insufficient to adequately substantiate either the emissions or fuel economy benefits claimed for the device. We have concluded there is no technical basis to justify an EPA confirmatory test program on the device or to expect that the device would improve either emissions or fuel economy.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Automobiles Fuel Consumption Exhaust Emissions Tests	Fuel Economy Gas Saving Device	

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES
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EPA Evaluation of the PETRO-MIZER Device Under Section 511 of the Motor Vehicle Information and Cost Savings Act

The Motor Vehicle Information and Cost Savings Act requires that EPA evaluate fuel economy retrofit devices and publish a summary of each evaluation in the Federal Register.

EPA evaluations are originated upon the application of any manufacturer of a retrofit device, upon the request of the Federal Trade Commission, or upon the motion of the EPA Administrator. These studies are designed to determine whether the retrofit device increases fuel economy and to determine whether the representations made with respect to the device are accurate. The results of such studies are set forth in a series of reports, of which this is one.

The evaluation of the PETRO-MIZER device was conducted upon the application of the manufacturer. The device is a fuel line magnet which is claimed to reduce emissions, to improve fuel economy, and to increase engine horsepower.

The following is the information on the device as supplied by the Applicant and the resulting EPA analysis and conclusions.

1. Title:

   Application for Evaluation of the PETRO-MIZER Device Under Section 511 of the Motor Vehicle Information and Cost Savings Act

2. Identification Information:

   a. Marketing Identification of the Product:

      PETRO-MIZER
      Model M K I for gas & diesel cars and gas trucks
      Model 3-J-80 for diesel trucks

   b. Inventor and Patent Protection:

      (1) Inventor

      John Mitchell
      3940 Sunny Dunes Road
      Palm Springs, CA 92264

      (2) Patent

      On file with Hubbell, Cohen, Stiefel & Gross, P.C.
      551 Fifth Avenue
      New York, NY 10176
      "For any information regarding patent, I have been advised to refer you to Lawrence G. Kurland, 212-687-1360."

No copy of the patent was provided and EPA did not request a copy of the patent in our follow-up correspondence.

c. Applicant:

(1) Petro-Mizer East
Division of Ament Enterprises
33 Pondview Road
Rye, NY 10580

(2) Principals

Charles E. Ament
33 Pondview Road
Rye, NY 10580
914-967-1960

(3) Charles E. Ament is authorized to represent Petro-Mizer East in communication with EPA

d. Manufacturer of the Product:

(1) Petro-Mizer East
725 Eugene Road
Palm Springs, CA 92264

(2) Principals

Charles E. Ament

3. Description of Product (as supplied by Applicant):

a. Purpose:

"A fuel line device to improve horsepower, mileage, and decrease pollutants in gas and diesel powered vehicles."

b. Theory of Operation:

"The PETRO-MIZER is a device which, when used in a fuel line leading to the engine of an automobile or truck, results in improved fuel efficiency and reduction in the amounts of polluting emissions. The exact means by which the PETRO-MIZER acts to improve engine efficiency and reduce pollutants is not proven. One theory offered is that the magnetic field produced by the PETRO-MIZER acts upon the electric dipole moments of the fuel molecules tending to produce a polarization and general alignment of the molecules. Although the polarization effect is partially lost before combustion takes place a degree of alignment remains which serves to facilitate the oxidation process."

c. Construction and Operation:

"The PETRO-MIZER consists of a tube made from non-magnetic material through which the fuel to be treated flows. Permanent bar magnets are mounted against the tube and sealed in place with resin. A metal casing acts as the outer shell of the device. The PETRO-MIZER is installed in the fuel line as specified in section 4-b-1. It is an entirely solid state device and requires no connection to external power."

d. Specific Claims for the Product:

Substantial fuel savings: The applicant cited the results from two test reports in support of this claim. A letter from Zellerbach Paper Co. noted a 14% increase in miles per gallon from 2 diesel-powered vehicles in fleet usage. The report by Olson Engineering on a 1980 Ford Fairmont indicated a 9.8% increase over the Highway Fuel Economy Test. The Olson report also included test results from the Federal Test Procedure which indicated a 5.7% improvement although this finding was not cited as verification of this claim. Copies of both reports were submitted with the application.

Increased Horsepower: "Dynamometer tests from Clayton Mfg Co., El Monte, CA and Cummins Diesel Engines of CT., Hartford, CT." No percentage improvements were cited for these tests. Copies of both reports were provided.

Reduction in Exhaust Emissions: "Olson Engineering Inc. report, page 10. HC reduced 46.3%. CO reduced 15.4%." A copy of this report was provided.

e. Cost And Marketing Information (as supplied by Applicant):

Price Range:	Model 3-J-80	$125.00 to $175.00
	Model M K I	$80.00 to $130.00

Distribution: Warehouse Distributors

4. Product Installation, Operation, Safety and Maintenance (as supplied by Applicant):

a. Applicability:

"PETRO-MIZER is suitable for all gas and diesel fueled engines. Model 3-J-80 for diesel trucks. Model M K I for gasoline engines and diesel cars."

b. Installation - Instructions, Equipment, and Skills Required:

(1) "Install PETRO-MIZER in the fuel line as near as practical to the carburetor on carbureted engines, and as near as practical to the injector pump on fuel injected engines.

(2) "Do not install while the engine is hot.

(3) "Use only factory approved fittings, and hose connections, or SAE approved equipment.

(4) "Keep PETRO-MIZER at least 1/2" away from any heavy metal mass, such as engine block.

(5) "If additional support is needed for the PETRO-MIZER, fasten strap hangers to the copper tube, not the body of the PETRO-MIZER.

(6) "Upon completion of installation, be sure and check for fuel leaks before starting engine.

(7) "Upon start up you may encounter higher engine RPM. Adjust down to manufacturer's specifications."

c. Operation:

"The PETRO-MIZER requires no maintenance or service."

d. Effects on Vehicle Safety:

"After proper installation, there are no special safety hazards."

e. Maintenance:

"No maintenance is anticipated."

5. Effects on Emissions and Fuel Economy (submitted by Applicant):

a. Unregulated Emissions:

"No studies have been made at this time."

b. Regulated Emissions and Fuel Economy:

"See Olson Engineering Report attached."

6. Analysis

a. Description:

(1) Although the applicant notes that he is unsure of the exact mechanism, the theory of operation as given in Section 3b suggests that the alignment of dipolar molecules can enhance combustion efficiency and, thus, emissions and fuel economy. EPA is unaware of any information that demonstrates that magnetically treating the fuel will affect the combustion process.

The 511 application for a device known as the Moleculetor made similar claims. The Moleculetor is a hollow cylinder of aluminum that is installed in the fuel line. The application claimed that the device aligned the molecules by inducing a "force field" on the fuel. EPA tested the Moleculetor and found no emissions or fuel economy benefit (EPA-AA-TEB-511-81- 11). An article on the Moleculetor in Car and Driver (February, 1981) contained the following statement by John C. Hilliard, Assistant Professor of Mechanical Engineering, Automotive Laboratory, University of Michigan:

> "Hydrocarbon fuels such as gasoline have hardly any dipole (separation of positive and negative charges), and for this reason, the fuel molecules would not align appreciably in this type of device. If they were aligned, the fuel dipoles would certainly be randomized subsequently-if not in the fuel line, then in the process of vaporization prior to actual combustion. Furthermore, even if such an alignment device did what the Moleculetor's manufacturer claims this one does, there would be absolutely no advantage to any aspect of mixture preparation or flame propagation relating to combustion efficiency or vehicle fuel economy."

(2) The description of the device provided in Section 3c was adequate.

b. Installation, Operation, Safety and Maintenance:

(1) Applicability:

The statement of the applicability of the product to essentially all gasoline or diesel vehicles is judged to be reasonable.

(2) Installation - Instructions, Equipment and Skills Required:

The installation instructions given in Secton 4b adequately describe the installation of the device. Installation with ordinary hand tools can be readily accomplished by the average do-it-yourself person who is able to service his own car. The installation is simple and should require no more than 15 minutes.

(3) Operation:

The device is judged to be automatic and require no inputs from the vehicle operator.

(4) Effects on Vehicle Safety:

Based on the information provided, the device is judged to be capable of being fabricated and installed so that it is safe in normal vehicle operation.

(5) Maintenance:

The statement of the applicant that no maintenance is anticipated is judged to be reasonable. However, the added fuel fittings and hoses would require the normal periodic inspections given to similar components in the vehicle.

c. Effects on Emissions and Fuel Economy:

(1) Unregulated Emissions:

The applicant indicated that these emissions had not been studied. Since the device does not modify the vehicle's emission control system or powertrain, the device should not significantly alter the unregulated emissions of a vehicle.

(2) Regulated Emissions and Fuel Economy:

While the applicant did submit test data in accordance with the Federal Test Procedure (FTP) and the Highway Fuel Economy Test (HFET), the test data consisted of only one test sequence (FTP and HFET) with and without the device. Moreover, only one vehicle was tested.* These data, were obtained at Olson Engineering and are listed in Table 1.

*The requirement for test procedures is stated in the policy documents that EPA sends to each potential applicant. EPA requires duplicate test sequences, both before and after installation of the device, on a minimum of two vehicles. A test sequence consists of a cold start FTP plus a HFET or, as a simplified alternative, a hot start LA-4 plus a HFET. Other test results which have been collected in accordance with standardized procedures are acceptable as supplemental data as long as the results are statistically significant.

Table I
FTP and HFET Results for the Petro-Mizer
1980 Ford Fairmont

	FTP (grams/mile) HC	CO	NOx	FTP MPG	HFET MPG
Baseline	.41	3.83	.89	17.65	24.25
PETRO-MIZER	.22	3.24	.96	18.66	26.65
Percent Change	-46	-15	+7.9	+5.7	+9.8

These results indicated the device had hyrocarbon, carbon monoxide and fuel economy benefits but nitrogen oxide penalties. However, due to the variabilities associated with this type of testing, this limited amount of data is insufficient to substantiate the claims for the device.

The data from the two trucks from the Zellerbach fleet did not include evidence that they were collected under controlled test conditions. For example, there was no indication of how the vehicles were operated (routes, drivers, weather conditions, etc.) during the test period.

The chassis dynamometer testing by Clayton Engineering and Cummins Diesel Engines, Inc. were relatively uncontrolled and do not show that the device improved emissions, fuel economy, or power. The Clayton data showed an increase in maximum horsepower at 3000 rpm but did not identify which tests were with or without the device. Also, more than a month of vehicle operation occurred between these tests and the engine parameters had changed, e.g., idle rpm increased from 550 rpm to 800 rpm. The Cummins data showed essentially no difference in power.

Although the preceding data submitted by the applicant was useful in our preliminary evaluation of the device, these data did not substantiate the claims for the device nor justify confirmatory testing by the EPA. The applicant was advised of these data shortcomings and requested to conduct an appropriate test program at an independent laboratory (Attachment A). The applicant did not undertake this testing (Attachment B).

As noted in Section 6a(1), EPA is unaware of any information that provides a technical basis to support the claim for improved emissions and fuel economy for an in-line fuel magnet device like PETRO-MIZER. EPA previously tested and evaluated a similar product known as the Super-Mag Fuel Extender (EPA-AA-TEB-511-82-3) and provided a copy of the report to the applicant (Attachment M). This device showed no emissions or fuel economy benefit.

7. Conclusions

EPA fully considered all of the information submitted by the applicant. The evaluation of the PETRO-MIZER device was based on that information, EPA's engineering judgement and the results of the EPA's experience with similar devices.

The information supplied by the applicant was insufficient to adequately substantiate either the emissions or fuel economy benefits claimed for the device.

EPA testing of Super-Mag and Moleculetor, two devices similar to PETRO-MIZER, showed no emissions or fuel economy benefits. EPA is unaware of theories or data which could explain why exposing a hydrocarbon fuel to a magnetic field prior to induction into a combustion chamber would affect the combustion process and, thus, emissions or fuel economy. We have concluded that there is no technical basis to justify an EPA confirmatory test program on the PETRO-MIZER device or to expect that the device would improve either emissions or fuel economy.

FOR FURTHER INFORMATION CONTACT: Merrill W. Korth, Emission Control Technology Division, Office of Mobile Sources, Environmental Protection Agency, 2565 Plymouth Road, Ann Arbor, MI 48105, (313) 668-4299.

Note:
In report no. EPA-AA-TEB-511-81-9, EPA evaluated a different product that is marketed under a name similar to PETRO-MIZER. This device, known as the PETROMIZER SYSTEM, consisted of a carburetor base-plate adapter and fuel pressure regulator.

List of Attachments

Attachment A	Letter of May 14, 1982 from EPA to Charles E. Ament of Petro-Mizer East acknowledging receipt of the 511 application for PETRO-MIZER and requesting independent testing of the device.
Attachment B	Letter of September 20, 1982 from EPA to Charles E. Ament of Petro-Mizer East reiterating need for device testing. This letter also notified applicant that EPA would shortly close out the evaluation if test data wasn't provided.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ANN ARBOR, MICHIGAN 48105

May 14, 1982

OFFICE OF
AIR, NOISE AND RADIATION

Mr. Charles E. Ament
Petro-Mizer East
Division of Ament Enterprises
33 Pondview Road
Rye, NY 10580

Dear Mr. Ament:

We received your letter of April 28, 1982 in which you applied for an EPA evaluation of the PETRO-MIZER models MKI and 3-J-80 as emission and fuel economy retrofit devices.

Our Engineering Evaluation Group has made a preliminary review of your application and determined that, except for the test data, the application is essentially complete. We do not feel that the data you submitted are sufficient to support the claims for your device. Our specific comments are:

1. The program conducted by Olson Engineering consisted of only one vehicle with only one test sequence (FTP and HFET) in each configuration. While this amount of testing may have been adequate to substantiate the California Air Resources Board Executive Exemption Order, we require replicate results on at least two vehicles.

2. The test results from Consolidated Freightways, Thrift Pak Foods, and Zellerbach Paper Company were obtained under relatively uncontrolled test conditions. Also, the details of the fuel economy test program were not provided and no emission data were taken.

3. The test by Clayton Engineering represents a relatively uncontrolled chassis dynamometer test of a vehicle and does not indicate how either emissions or fuel economy of the vehicle was changed by the device.

4. The testimonal letter from Clayton Manufacturing provides no data to substantiate the claimed improvement in fuel economy. No specific fuel economy change was given and the "improved performance" was unspecified.

5. The test report from Cummins Diesel Engines, Inc. is also a relatively uncontrolled chassis dynamometer test of a truck.

In order to adequately process your application, we will need appropriate test data obtained by a recognized independent laboratory. The procedures and guidelines for this testing were transmitted to you in my letter of March 3. I am prepared to assist you in developing the test plan.

In order for us to process Section 511 applications efficiently, we have established a schedule for each. I ask that you respond to this letter by June 15. Please indicate what testing you plan to undertake and which independent laboratory will perform the testing. If you have any questions or require further information, please contact me.

As you may know, EPA has previously evaluated other similar devices. Enclosed is the Section 511 evaluation of the Super-Mag Fuel Extender, a device which appears to be similar to PETRO-MIZER. Even if you do not consider this device to be similar, you may find this report useful as an example of EPA test programs and 511 evaluations.

Sincerely,

Merrill W. Korth, Device Evaluation Coordinator
Test and Evaluation Branch

Enclosure

ATTACHMENT B

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ANN ARBOR, MICHIGAN 48105

September 20, 1982

OFFICE OF
AIR, NOISE AND RADIATION

Mr. Charles E. Ament
Petro-Mizer East
Division of Ament Industries
33 Pondview Road
Rye, NY 10580

Dear Mr. Ament:

We still lack appropriate test data to support your claims for "PETRO-MIZER" models MKI and 3-J-80 as emission and fuel economy retrofit devices. As I explained in our earlier letter and telephone conversations, we are obligated to publish our evaluation in the Federal Register. We cannot delay that action indefinitely and have begun to prepare our evaluation. Therefore, I must ask you again to provide the information we need or we will have to complete our evaluation and publish our conclusions with the information at hand.

Because of the inordinate amount of time that has passed since we first received your application and the difficulties encountered in getting the information for us to analyze, we are faced with the need to establish a deadline. That deadline is October 29. At that time, we will conclude our evaluation, with or without the requested information. We believe that that date allows enough time for our review of your plan and the conduct of the program at an independent laboratory. As we stated previously, at least two or three vehicles should be tested. If the data from the independent laboratory indicate a meaningful fuel economy or emissions benefit, EPA may perform confirmatory tests.

Please let us know when you send us the test plan what laboratory you have selected and the scheduled dates for your testing. If you have any questions about our requirements, please contact me immediately at (313) 668-4299.

Sincerely,

Merrill W. Korth
Device Evaluation Coordinator
Test and Evaluation Branch